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**Phase IA Archaeological Assessment
of the
Dover Gas Light Company Site
Dover, Delaware**

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AR300163

TABLE OF CONTENTS

I.	Introduction	1
	A. Purpose of Study	1
	B. Project Location and Description	2
II.	Methodology	3
III.	Historical Background	4
	A. Historical Overview	4
	B. Description of Coal Gasification Process	10
	C. Site Evolution	12
IV.	Description of Soil Borings	21
V.	Evaluation of Findings	36
	A. Historical Documentation	36
	B. Remote Sensing	37
	C. Soil Borings	37
VI.	Conclusions and Recommendations	39
	A. Conclusions	39
	B. Recommendations	40
	Bibliography	42
	Appendices	44
	A. List of Personnel	45
	B. Geophysical Survey	

LIST OF FIGURES

1.	Location Map	2
2.	Location of Dover Gas Works and Pipeline System in 1868	5
3.	Location of Dover Gas Works in 1885	14
4.	Location of Dover Gas Works in 1897	15
5.	Location of Dover Gas Works in 1910	17
6.	Location of Dover Gas Works in 1919	18
7.	Location of Dover Gas Works in 1929	19
8.	Test Boring Location Map	22
9.	Stratigraphic Profiles from Borings B-1/B-3	23
10.	Stratigraphic Profiles from Borings B-4/B-6	25
11.	Stratigraphic Profiles from Borings B-7/B-9	27
12.	Stratigraphic Profiles from Borings B-10/B-12	29
13.	Stratigraphic Profiles from Borings B-13/B-15	31
14.	Stratigraphic Profiles from Borings B-16/B-18	33
15.	Stratigraphic Profiles from Boring B-19	35

AR300165

I. INTRODUCTION

A. Purpose of Study

In March of 1991, Engineering-Science, Inc. conducted a Phase IA archaeological assessment of the Dover Gas Light Company Site in Dover, Delaware. This study was conducted for Versar, Inc of Springfield, Virginia. All work was conducted in accordance with Section 106 of the Historic Preservation Act of 1966 as amended (36 CFR 800; 36 CFR 66).

The purpose of the study is to assess the archaeological potential of the study area by means of historical and archival research, in combination with an analysis of the results of a geophysical study and soil borings on the site. This report presents the results of the land use assessment and provides recommendations for further evaluation of potential archaeological resources on the site.

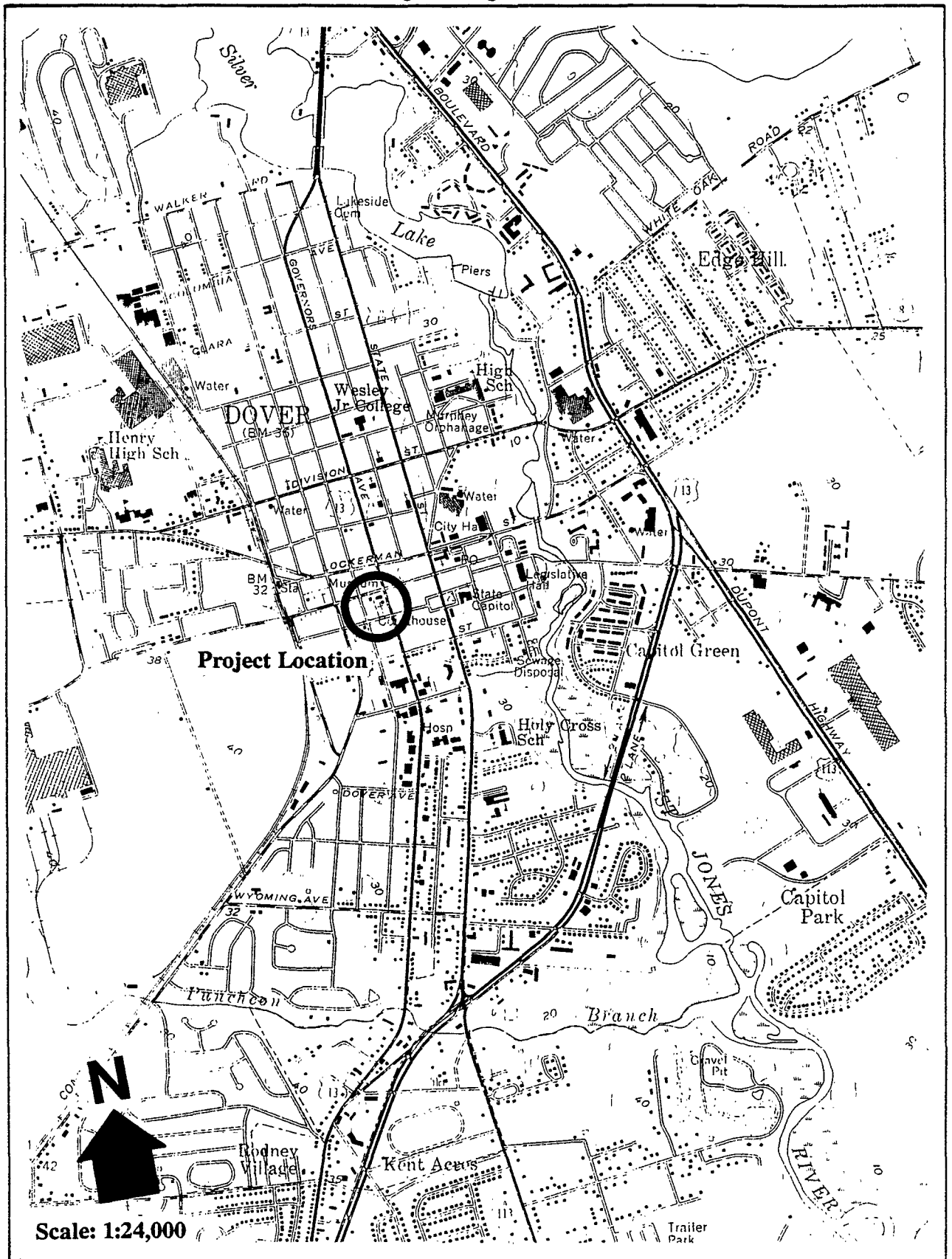
B. Project Location And Description

The site of the former Dover Gas Works is located within the city limits of Dover, Delaware on the west side of the city, northeast of the Tar Branch (formerly Meeting House Branch) of the St. Jones River [Creek] (*Figure 1*). Conrail tracks (formerly the Delaware Railroad) lie in a north-south direction several blocks west of the gas works site. The public square and governmental buildings are located several blocks to the east. The site occupies the western half of the block bounded by North and New streets, Bank Lane, and Governor's Avenue. The former Presbyterian Church and Cemetery, now owned by the Delaware State Museum, occupies the eastern portion of this block.

The Dover Gas Light Company coal gasification plant produced gas for lighting industrial, commercial, institutional, and residential buildings, as well as street lamps. The facility was in operation from 1859 until 1948, at which time many of the structures associated with the coal gasification process were demolished. The archaeological assessment of the Dover Gas Light Company Site is based on three categories of research: (1) documentary research, (2) remote sensing, and (3) soil borings.

By-products of the coal gasification process included coke, ash, char, and tar. Various studies have been conducted by Duffield Associates (1984), the Delaware Department of Natural Resources and Environmental Control (1985) and Versar (1985, 1989) to assess the nature of the contaminants on the site. Prior to the initiation of the remote sensing study, a Health and Safety Plan was prepared by Engineering-Science, Inc. (1991). The site was classified as inactive for the geophysical survey and no special precautions were needed as no ground breaking activities were necessary. During the soil boring study, Level D protection was used. Level C equipment was available on-site, but upgrading did not prove necessary. Appropriate precautions were taken for the monitoring of the soil borings (see Appendix B, Geophysical Survey).

AR300166



Source: USGS/ Dover, DE

Dover Gas Light

Figure 1
Project Location Map

AR300167

II. METHODOLOGY

In order to assess archaeological potential, historical research was undertaken both in Washington, D.C. and Dover, Delaware. The research was directed toward understanding the evolution of site use and development since construction of the gas works in the 1850s. Features were identified by examining historic maps which indicated the locations of now-demolished buildings and structures. Research also focused on understanding the historic process of coal gas manufacture, particularly how the technology determined both above-ground and subsurface development.

The Bureau of Museum and Historic Sites of the State of Delaware was consulted initially. As administrators of the site, now owned by the State, the Bureau maintains files of historical materials which were available. In addition, maps, published local histories, and photographs, both historic and current, were obtained from the Hall of Records in Dover. Documentation of other gas works in the United States was obtained from the Historic American Engineering Record (HAER) of the National Park Service. Finally, primary and secondary materials from the Library of Congress were examined.

A geophysical survey was conducted to determine the presence of subsurface features using ground penetrating radar and electromagnetometry, and the survey was monitored by an archaeologist. A complete description of the methods employed and results can be found in *Dover Gas Light Geophysical Explorations* (Bowers 1991).

Soil borings were monitored by an archaeologist to assist in determining the potential for archaeological resources in the project area. Soil profiles were drawn to vertical scale for each soil boring, and descriptions of each stratum were recorded. The location of all soil borings was recorded on a site map (*Figure 8*).

Data from each of these categories was analyzed. Historical documentation provided information on the nature of the coal gasification process and the location of structures and associated features. Findings from the geophysical survey and the soil borings as well as the historical documentation assisted in the prediction of the location of archaeological resources and the depth and nature of the fill.

AR300168

III. HISTORICAL BACKGROUND

A. Historical Overview

This property was first used for the production of gas in 1859 after Daniel Trump, of Philadelphia, bought 12,000 square feet of property from John C. Pennewill on October 11, 1859 (Scharf 1888: 1074). On the site, Trump immediately began construction of a building for manufacturing gas from resin. There is some confusion about the specific date of construction for the gas works. A local newspaper, the *Delawarean*, stated that the gas works were completed on October 8, 1859 with production beginning on October 15, 1859. This date, however, precedes the recorded date of purchase by three days (The *Delawarean* 1859; Kent County Deed Book Q, Volume 4: 345). In any event, the streets of Dover were first lighted by gas two months later, in December 1859. Gas mains were laid in a T-shaped configuration, extending from the gas works east to Main Street, south through the public square to Water Street. A pipeline also extended north along Main Street from North Street to Reed Street (Figure 2). Some of these mains, which date from the antebellum period, continued in operation until the gas works closed in the late 1940s.

With the Civil War, the price of resin became prohibitive which necessitated substituting coal oil, the term by which kerosene was originally known, and wood. In February 1867, the plant was purchased for \$5,000 by Alden B. Richardson and James Robbins, local cannery owners, who refitted the works to again use the resin process. However, by 1869, the works was converted to a coal gas process. Most of the buildings associated with the Dover gas works were not constructed until the early 1880s. Constructed in the late 1860s, the original retort house was the only building to date to this early period of coal gasification.

By 1870, the new owners had laid 5000 feet of additional piping with more laid at later dates. By 1888, the plant produced 6 million cubic feet of gas annually. By comparison, the New York Gas Light Company produced over 3,000,000 cubic feet of gas per day in the 1870s and 1880s (Park 1880: 925). In 1881, the company was incorporated with six directors. One of the directors, Harry A. Richardson, son of Alden B. Richardson, was named president of the newly formed, Dover Gas Light Company. On July 9, 1881, A.B. Richardson sold the gas works property to the Dover Gas Light Company. It is not known how long the gas works remained in the Richardson family, although at some point, it became a subsidiary of General Gas and Electric Corporation, a registered holding company. By 1919, the site is identified as the Dover Gas and Light Company, Gas Plant, suggesting that the this works, like those of many other gas companies, had been forced by competition from electricity to provide both forms of lighting. As early as 1898, the citizens of Dover had petitioned for better street lighting and had recommended electricity. The name change twenty years later indicates that Dover was following the national pattern in providing both forms of lighting.

AR300169

In 1935, the passage of the Public Utility Holding Company Act, intended to simplify the corporate structures within the utility industry through consolidation and mergers, resulted in the reorganization of General Gas and Electric Corporation. In addition to the Dover Gas and Light Company, General also owned Eastern Shore Public Service Company which provided gas to Cambridge, Maryland and electricity elsewhere on the peninsula. In 1942, General sold its interest in Dover Gas and Light to Harrison and Company, a Philadelphia investment banking firm which already owned the Hagerstown Gas Company in Hagerstown, Maryland. The general partners in the Harrison firm, Charles Harrison III, David B. Sharp, Jr., and Robert E. Daffron, Jr. had been instrumental in the formation of Chesapeake Utilities.

The site of the Dover Gas and Light Company was sold and deeded to the State of Delaware and administered by the Public Archives Commission in December 1949. By 1950, all the buildings had been demolished with the exception of the original retort house. This building was used by the Delaware State Museum to store heavy exhibits until the mid-1980s. In 1955, the remainder of the property was leased to the Dover Parking Authority for use as a municipal parking lot. In 1966, the Johnson Building of the museum was constructed on the southwest corner of the site. The storage building, which was the only remaining gas works building, was compromised in a fire on July 1, 1982, and the building was demolished several years later.

The gas works were constructed soon after the extension of the railroad from Wilmington in the mid-1850s. The creation of the Delaware Railroad, in actuality an extension of the Philadelphia, Wilmington, and Baltimore Railroad, transformed the downstate region, encouraging changes in industrial and agricultural production, the growth of new towns, and the development of beach tourism. This process made Dover, the state capital, the center of an expanding, regional commercial and industrial economy. The area surrounding Dover supported a rich agricultural base. With the coming of the railroad, agricultural production expanded away from the growing of grain, which did not require immediate transport to markets, to include the more lucrative fruits and vegetables. Rail transportation allowed for the rapid shipment necessary for perishables and permitted the growth of wider markets for all agricultural products. In addition, Dover, as the distribution point for this agricultural economy, became a food processing center. Numerous canneries were established, as were factories for making food processing equipment. Packing houses and distilleries also proliferated.

The timing of the railroad was fortuitous, allowing Dover canneries to take advantage of both new distribution methods as well as new techniques of canning which were appearing by the late 1850s. The canning industry was one in which technological developments, in tandem with those in can-making, led to the rapid automation of process. These developments resulted in a factory system of production which was dependent upon a reliable and plentiful source of power. The period between the Civil War and the turn of the century was characterized by a wide range of mechanical inventions which made both canning and the can-making processes fully automated by 1900. Although gas light is often associated with street

AR300171

and home lighting, its primary customer was industry. Manufacturing concerns needed illumination not only to extend working hours but also to adequately light building interiors. Indeed, eight years after Dover was first illuminated with gas lights in 1859, Richardson and Robbins, one of the most prominent Dover canneries, bought the gas works, undoubtedly in part to ensure an adequate power source for their lighting and manufacturing purposes.

The process of canning, the hermetically sealing of heat processed foods, was developed by a French confectioner, Nicolas Appert, in 1810. However, canning was slow to gain much acceptance in the United States until the 1840s. The initial impetus for the growing popularity of canned foods stemmed from the California Gold Rush and subsequent western movement. The long journeys associated with this mobility required easily transported, preserved foods. Numerous commercial canneries were established between 1850 and 1860, particularly in New York, Maryland, and Delaware. New York and Baltimore became leading canning centers because of proximity to fishing and oystering areas. Delaware took advantage of the diverse agricultural economy of the lower peninsula and became a focus of fruit and vegetable canning as well as various forms of meat packing.

Military needs also were powerful incentives to the canning industry, both in Europe and the United States. In particular, the Civil War stimulated the formation of an American canning industry and spurred the development of new canning and can-making techniques. A.B. Richardson and James Robbins, as well as other Maryland and Delaware canners, benefitted from wartime supply contracts although technological limitations prevented the making of vast fortunes. While the war provided an immediate catalyst, increasing industrialization and urbanization ensured that the demand would continue into peacetime.

It was in this period of rapid industrial expansion that the Dover gas works were constructed. Although initially constructed and operated by an independent owner, the works quickly became associated with one of the leading canneries of Dover. A.B. Richardson and James Robbins had entered business together in the early 1850s when they operated a tin and stove store in Dover. From their store, they began canning on a small scale. Established in 1855, as Richardson and Robbins, they marketed 600 cans the following year. . By 1862, they were producing 40,000 cans annually. In 1863, Richardson and Robbins purchased a building at the corner of State and King streets which they fitted with canning machinery. After 1876 when Robbins died, Richardson's son, Harry A. Richardson, became a member of the firm. By the mid-1870s, the company was canning meats, in particular chicken. In 1881, their greatly expanded business necessitated the construction of a new building for which nine acres of land on King Street were bought (Scharf 1888: 1074-1075). Richardson and Robbins Company continued in operation until 1962.

Gas light for public and private illumination was almost exclusively an urban phenomenon. The growth of cities during the eighteenth and nineteenth centuries created a demand for street lighting, which was initially met by oil or candle lamps and which were the responsibility of private citizens. However, by 1800, street

AR300172

lighting in the larger cities was becoming increasingly a municipal responsibility. The streets of London were first lighted by manufactured gas in 1813. The first gas company in the United States was organized in Baltimore in 1816, but by 1835, larger cities such as New York, Brooklyn, Boston, and New Orleans all had gas companies. The technology of producing gas from coal had been invented in the early eighteenth century in Europe. However, the impetus for its use in the United States stemmed from the War of 1812 when the textile mills in New England began using gas light in order to operate mills past dusk, thus increasing daily production. Subsequently, manufactured gas was quickly adopted for small businesses located near the mills.

Manufactured gas was a versatile illuminant and was used not simply for street lighting but also for commercial, industrial, and private residential purposes although residential use was slower to fully take hold. In addition, gas had little competition throughout the nineteenth century until the widespread availability of electricity. Natural gas began production during the Civil War, but because of distribution problems, it was used only near the gas fields of the South and Southwest until the 1920s. By the 1850s, when the first efficient meters were introduced, the business of providing widespread gas light service became commonplace. By 1875, there were over four hundred gas companies in the United States, most of which were located in larger cities (Passer 1953: 12). Gas was usually produced from a central station where economies of scale resulted in lower unit prices and thus increased demand. However, gas works were also found in smaller cities and towns although rarely in rural areas. Only with technological advances which lowered production costs could a small urban area sustain a gas company. Small town businesses and manufacturing facilities often had to operate their own gas works in the absence of a market sizeable enough to attract an independent operator. By 1900, gas works could be found in towns with populations as low as 5,000.

The advent of electric lighting by the 1880s, both arc lighting and incandescent, had serious repercussions for the gas light industry, although electricity only surpassed gas for lighting after the turn of the twentieth century. Arc lighting held advantages over gas for lighting large areas, such as streets. This, however, was not especially deleterious to the gas companies because street lighting was largely unprofitable for the gas companies. In many cities, street lighting was undertaken solely as a prerequisite to obtaining a city franchise. Electric arc lighting for streets was first used in Cleveland in 1879 with portions of New York and Washington following in the early 1880s (Kranzberg and Pursell 1967: 224).

Incandescent lighting, however, was particularly threatening to the gas industry. By the 1890s, interior illumination, the area in which electric lighting was particularly competitive, accounted for 90% of all gas revenues (Passer 1953: 196). In 1882, the first steam powered, central generating plant, the Pearl Street Station, was installed in New York by the Edison Electric Company to serve 500 customers. However, it was the demonstrations at the Columbian Exposition, held in Chicago in 1893, which greatly promoted a widespread acceptance of electric lighting. By the early years of the twentieth century, production and distribution of electricity had

been perfected which gradually, but effectively, diminished the hegemony once held by the gas industry.

Similar threats to the gas industry appeared in the 1860s with the introduction of kerosene lamps (also called coal oil lamps because it was first distilled from coal) following the discovery of oil in Pennsylvania in 1859, and the possibilities of large scale petroleum production and refining. As a result of this new energy source, new techniques of gas production appeared by the 1870s. In particular, the production of water gas, a simpler process in which steam was forced through hot coke, reduced the costs of production. The introduction of gas mantles, in the 1890s, to improve the quality of light allowed the gas companies to compete with incandescent electricity in the area of interior lighting. Nonetheless, improvements in product quality and price reductions did little but delay the impending dominance of electricity for lighting.

One response to these changes in the industry was to diversify, and thereby increase, the market for gas. Gas stoves and gas heating both became points of promotion during the 1880s although the process was a slow one. Manufactured gas, while extensively used for lighting during the nineteenth century, had held virtually no market for heating. Gas companies also began providing electricity to customers. By the mid-1880s, gas companies in a number of cities began offering electric lighting service. By 1887, approximately forty gas companies supplied electric lighting. By 1889, the number had risen to 266, or roughly 25% of all gas companies in the United States. Ten years later, 40% of all gas companies supplied electric lighting (Passer 1953: 199). In addition to the lighting market, gas companies undoubtedly decided to move into electricity production because of changing manufacturing needs. The use of electric power to operate machinery and to heat and light factories increased thirty fold during the 1890s, or roughly fifteen times the increase in total power used by industry (Passer 1953: 343). Ironically, at the turn of the century, large factories with their own mechanical power plants were less apt to use electric motors for automated processes. Small factories, however, where mechanical power generation was less efficient, were a ready market for electric motors.

In the twentieth century, manufactured gas increasingly found its share of the utilities market compromised. In addition to developments in electrical production which allowed for broad distribution patterns, new techniques in welding, developed in the late 1920s, solved the pipeline problems which had hampered the widespread use of natural gas. By the mid-1930s, it was possible to transport gas economically for a thousand miles. With a heat content twice that of coal gas and lower prices, natural gas began to be used for house heating, central power stations, and industry. The mass marketing of this inexpensive and abundant fuel by the post-World War II era effectively ended the manufactured gas industry.

B. Description Of Coal Gasification Process

The location of a gas works was dictated by access to coal for processing. This requirement usually resulted in locations near the railroad station, or freight depot, in order to limit long distance cartage. Most small gas works included gasholders, a retort house with a monitored, or louvered, roof, and a foreman's house, because the foreman could be needed anytime night or day. Coal for firing was stacked in the yard but never more than 8 or 9 feet high because of the danger of spontaneous combustion.

The coal gasification process included three operations: distillation, condensation, and purification. The distillation of coal produced two by-products besides the coal gas. The bituminous part could be distilled into coal tar, and the fixed base of the coal became coke.

Distillation took place in retorts, long, semi-cylindrical, D-shaped vessels constructed of cast iron or clay. Six or eight retorts were built into a "setting," or brick arch, beneath which a coke furnace burned to maintain the proper temperature. The furnace was usually located in a pit with its charging door at ground level. Originally, the coke produced during the distillation process was used for firing the furnace, called a direct firing setting, which wasted a resalable byproduct. In 1861, the German engineering firm of Siemens invented the gas producer furnace in which the coke was burned with insufficient air for complete combustion. The resulting carbon monoxide rose and surrounded the retort vessels. A secondary source of air was admitted to the combustion chamber which burned with the carbon monoxide. This generator type of furnace improved efficiency and was commonly found in small gas works in Britain until the 1930s. The regenerator setting was developed in 1885 when the Klönne recuperator was invented. The regenerator setting used the outgoing hot gases to pass through a series of brick passages where the gases were mixed with a secondary air source, and combustion occurred around the retorts (Wilson 1976: 35).

The distillation of coal occurred through carbonization, or the heating in the refractory vessel, the retort, until all volatile elements, such as gas, tar, and ammonia were eliminated, leaving only the coke. Coal was selected for its high content of volatile matter and low ash content. The retorts were fired prior to the addition of coal. Iron retorts were fired to temperatures of 1470 degrees Fahrenheit. After 1853, clay was available, and retorts made of fireclay could be fired to temperatures ranging from 2010 to 2370 degrees Fahrenheit (Wilson 1976: 35). Clay retorts were considered better than iron because they could be fired to hotter temperatures and retained their heat longer (silica retorts were not available until the 1920s). The coal itself was exposed to temperatures ranging from 1500 to 1600 degrees Fahrenheit. Gas was emitted from the firing process, and the coal usually remained in the retort for about eight hours at which point only coke remained.

The coal gas had to be removed as soon as possible. It was drawn up through a conduit called an ascension pipe from which it passed to the hydraulic main. To

AR300175

aid in the transfer, an exhaustor, or rotary pump, was used to pump the gas from the retorts to the condenser, washer, purifier, and finally to the gasholder. The hydraulic main was a large, horizontal tube which extended the entire length of the retort house and which was connected to the retorts by "dip pipes." The main was filled with tar and ammoniacal water which was maintained at a constant level by an overflow mechanism to a tar well. The liquid acted as a sealant to the pipes so that gas could not escape during the draining and charging of the retorts.

From the main pipe, the gas passed to the condenser, which consisted of a series of iron tubes placed into cisterns of cold water or which were exposed to the air. The gas cooled, and the tar, which has been suspended through the gas, was deposited into an underground storage tank. The tar and ammoniacal liquor were also separated during the condensation process by directing the flow into different wells from the gas.

The coal gas was then passed to a washer and a scrubber, or directly to a scrubber if a washer was not used. The washer was a square, iron vessel into which the crude gas passed from the top. The vessel was nearly filled with water and also contained tubes which were pierced with fine holes. The gas was allowed to bubble through these holes, the diameters of which were narrow enough to prevent the tar from entering. The tar sank to bottom and eventually into the tar well. A ton of coal yielded about 12 gallons of tar which was sold but was also used as protective coating over much of the gas works. The washing and scrubbing stage removed much of the sulphuretted hydrogen and sulphur compounds as well as the last of the tar and ammonia. The scrubber was a tall, cast iron tube about 4 feet in diameter filled with broken brick or wooden grids. The gas passed slowly upward through the tube and was sprayed by water from the top. The liquid also drained to the tar well.

There were four methods of purification, the last stage in the gas production process. Two of the purification methods involved the use of lime, either wet or dry. These were the least desirable because of the noxious fumes produced from the wet lime process as well as the problem that once saturated the lime mixture could not be reused. In 1849, a hydrated form of iron was found to be an effective way of purifying. Named for its inventor, the Lauring method was advantageous because the iron could be reused. The preferred method, however, involved the use of iron ore, or "bog iron ore," where the sulfate and hydrate of lime used with the Lauring process were eliminated after it was discovered that they were unnecessary for cleaning the gas.

After purification, the gas entered the station meter for reading. The station meter was a horizontal, cast iron drum about 4 feet in diameter and 5 feet long which was filled to the halfway point with water. The gas passed through the drum which was divided into compartments displacing the water and making it rotate. The revolutions were counted to give the reading. The difference between the station meter reading and the consumer's reading indicated any gas loss by leaking.

The manufactured gas then was stored in gasholders. Gasholders were sometimes called "gasometers" because the quantity of gas stored was indicated by

the position of the tank. The holder was not simply a means of storage but was also designed to put pressure on the gas for distribution. Pressure was measured not by pounds per square inch but by the number of inches of water that could be supported in a column. There were two types of holders: the single lift holder and the double lift, or telescopic, holder, which used counterpoises for vertical movement.

The gasholder was an iron tank, open at the bottom, and inverted into a tank of water, located below ground level. The holder rose and fell depending upon gas capacity, with the water providing a seal where the cylinder met the ground. The movement was guided by a steel frame with upright rods which were fixed at several points. The holder was counterbalanced so as not to exert pressure on the gas at a measurement greater than a six inch column of water. For a 150,000 cubic foot capacity holder, the diameter was 87 feet 6 inches and 25 feet high. A 300,000 cubic foot capacity holder measured 100 feet in diameter and stood 39 feet tall. A 12,200 cubic foot holder was 36 feet in diameter and 12 feet in height. The largest gasholder in the world, during the 1880s, was located in London with a 3,000,000 cubic foot capacity and 230 feet in diameter. The largest in the United States at the time belonged to the New York Gas Light Company and was 168 feet in diameter and stood 70 feet tall. Its capacity was 1,500,000 cubic feet (Park 1880: 923-924).

Only a small fraction of the gasholders built in the United States were sheltered by houses, constructed to keep the water seal from freezing, and more importantly, to protect the holder from snow loads and high winds which would impair operation. Nearly always, the gasholder houses were round brick buildings with conical slate roofs. Cupolas allowed leaking gas to escape with relative safety. Once common in New England and New York, the gasholders in Dover do not appear to have ever been housed, probably in part because of the relatively mild climate.

Prior to the manufacturing of gas from coal, the Dover Gas Works produced gas from both coal oil and resins. For the coal oil process, the gasification is much the same as with solid coal. This process also used retorts, which were often filled with bricks or lumps of coke to increase the temperatures and thus shortening the gas production time and speeding the process. Cast iron retorts were used almost exclusively for oil-gas works. The production of oil-gas is a continuous process and thus differs from coal distillation which involved removing the coke from the retorts. The resin-gas process is virtually the same as with oil-gas production although the resin must first be liquified before distillation.

C. Site Evolution

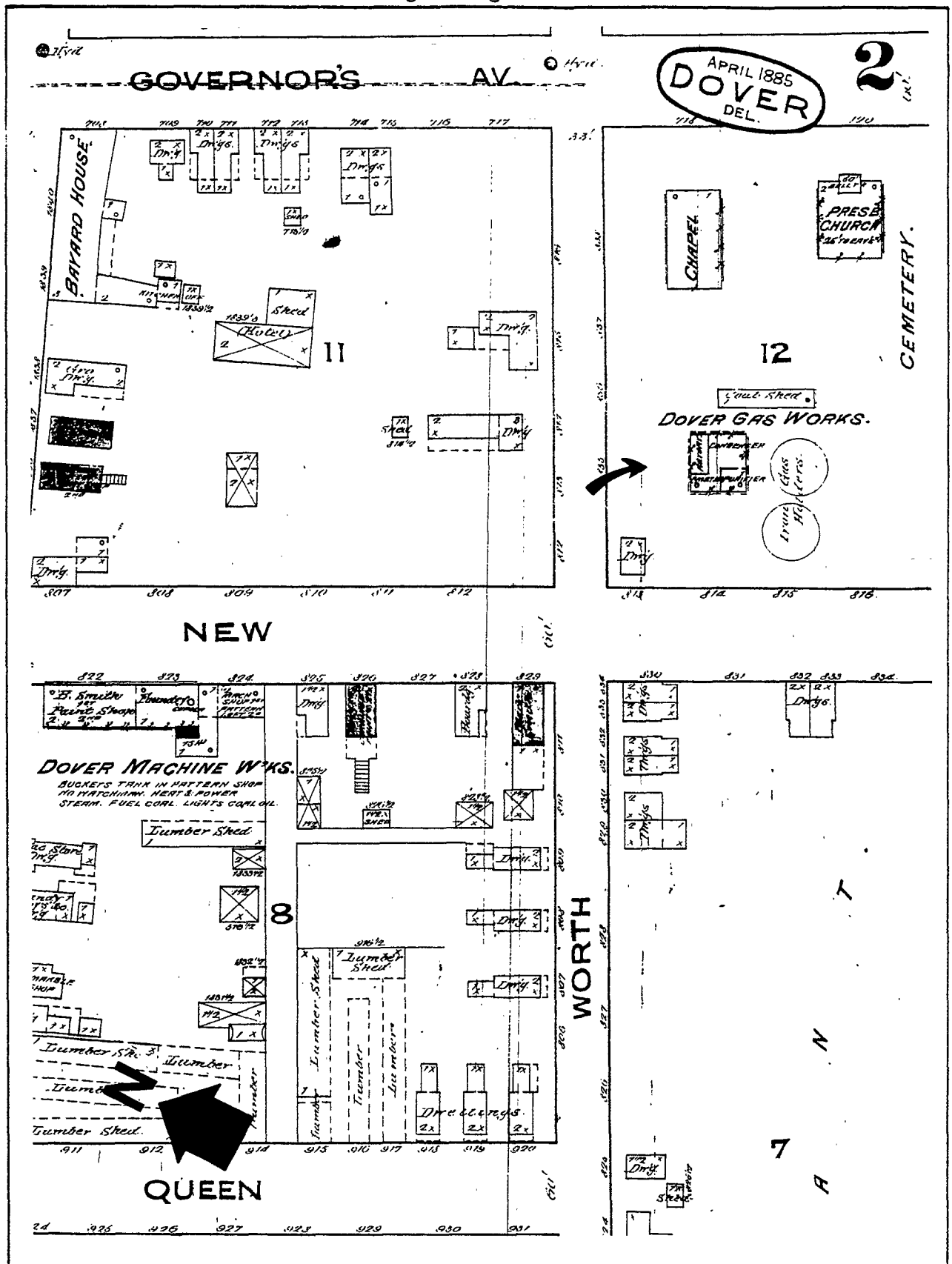
The following discussion on site evolution or development is based on a review of the 1868 Pomeroy & Beers Atlas map, and the Sanborn Insurance Maps from 1885 to 1950, which typically quite accurately record significant physical alterations to buildings on a site by means of the site plan, symbols and color codes.

AR300177

Five of these maps for the years 1885, 1897, 1910, 1919 and 1929 are included with this study to illustrate these changes.

- 1868 In 1868, the retort building, which stood until the mid-1980s, and one gasholder are shown on the site. The house which appear later in the northwestern corner of the property is not shown in 1868. New Street, which later forms the western boundary of the gas works, was not cut through south of Loockerman Street. (See *Figure 2*).
- 1885 In 1885, the site occupied roughly one-fourth of a city block. The works was comprised of a coal shed; two iron, or steel, gasholders which were not enclosed in gasholder houses; one building marked as a two-story dwelling and located in the northwest corner of the site; and one building which was roughly square in plan. This latter structure housed the retort, the condenser, the meter, and the purifier (in large plants, the retort, condensers, and purifiers were often housed in separate buildings by function). In the retort room, the coal was burned to produce a crude gas. The gas was then condensed to separate coal tars from the gas before purification which removed sulphur from the gas (*Figure 3*).
- 1891 The only recorded alteration to the site between 1885 and 1891 was the extension of the coal shed to almost double its original size, from North Street to the property boundary on the south (Sanborn 1891).
- 1897 By 1897, the coal shed remained large. A third gasholder was added to the site and appears slightly smaller than the original two. The original retort, condenser and purifier rooms were no longer used for their original purpose. A building was added to the southwest corner of the site to house the generator, blower, and meter with a separate room for additional purifying. The area surrounding the house in the northwest corner is shown by 1897 as a separate lot from the gas works. This structure is still used as a dwelling, and has a one-story rear addition (*Figure 4*).
- 1904 After the turn of the century, the original retort, condenser, and purifier building was still not in use. The new processing building was extended further north, with the engine room adjacent to the old iron gas

AR300178

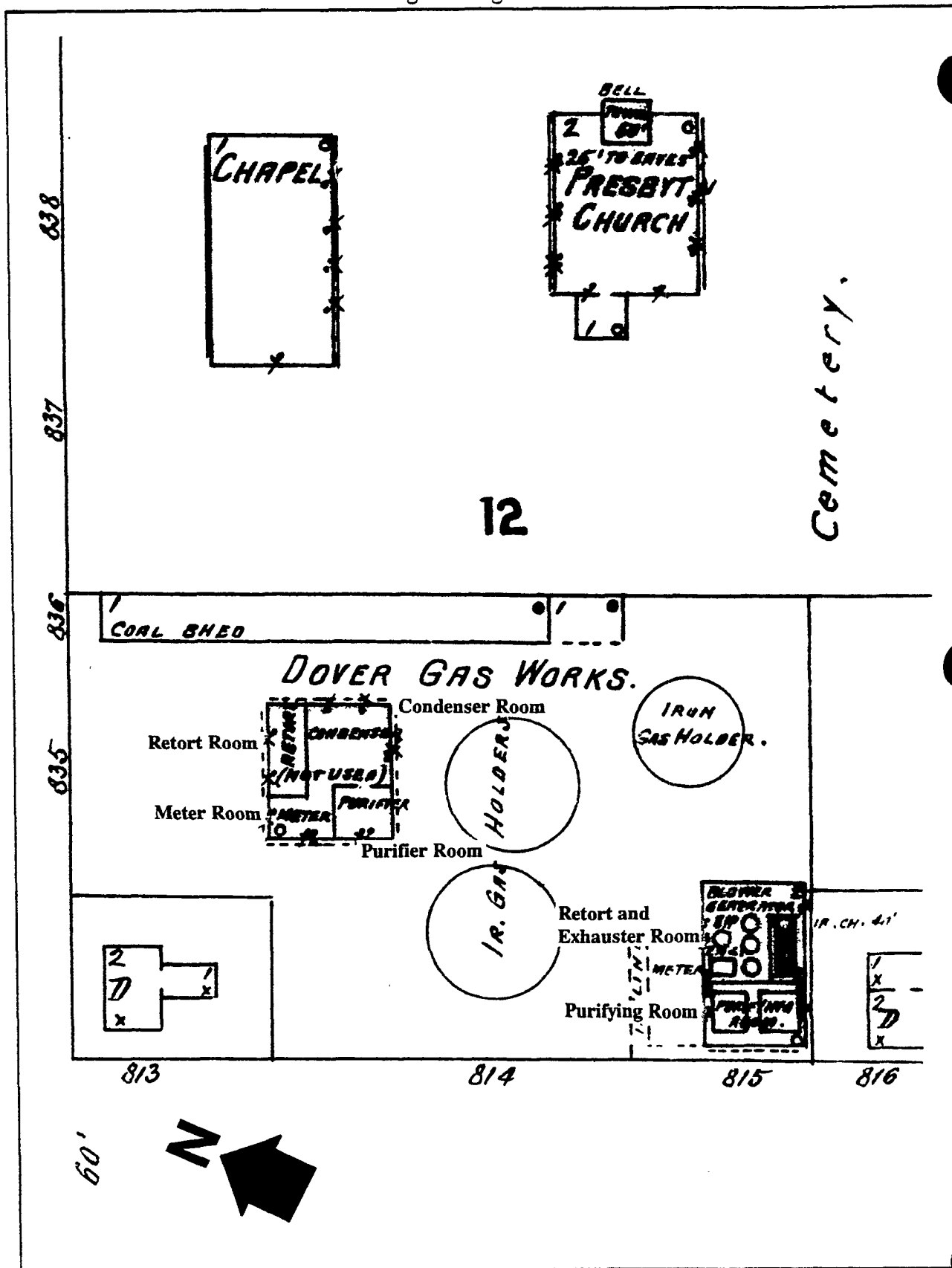


Source: Sanborn Fire Insurance Co. Map, 1885

Dover Gas Light

Figure 3
Dover Gas Works Site in 1885

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Source: Sanborn Fire Insurance Co. Map, 1897

Dover Gas Light

Figure 4
Dover Gas Works Site in 1897

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holders. The coal sheds on the eastern boundary of the property had been removed (Sanborn 1904).

1910

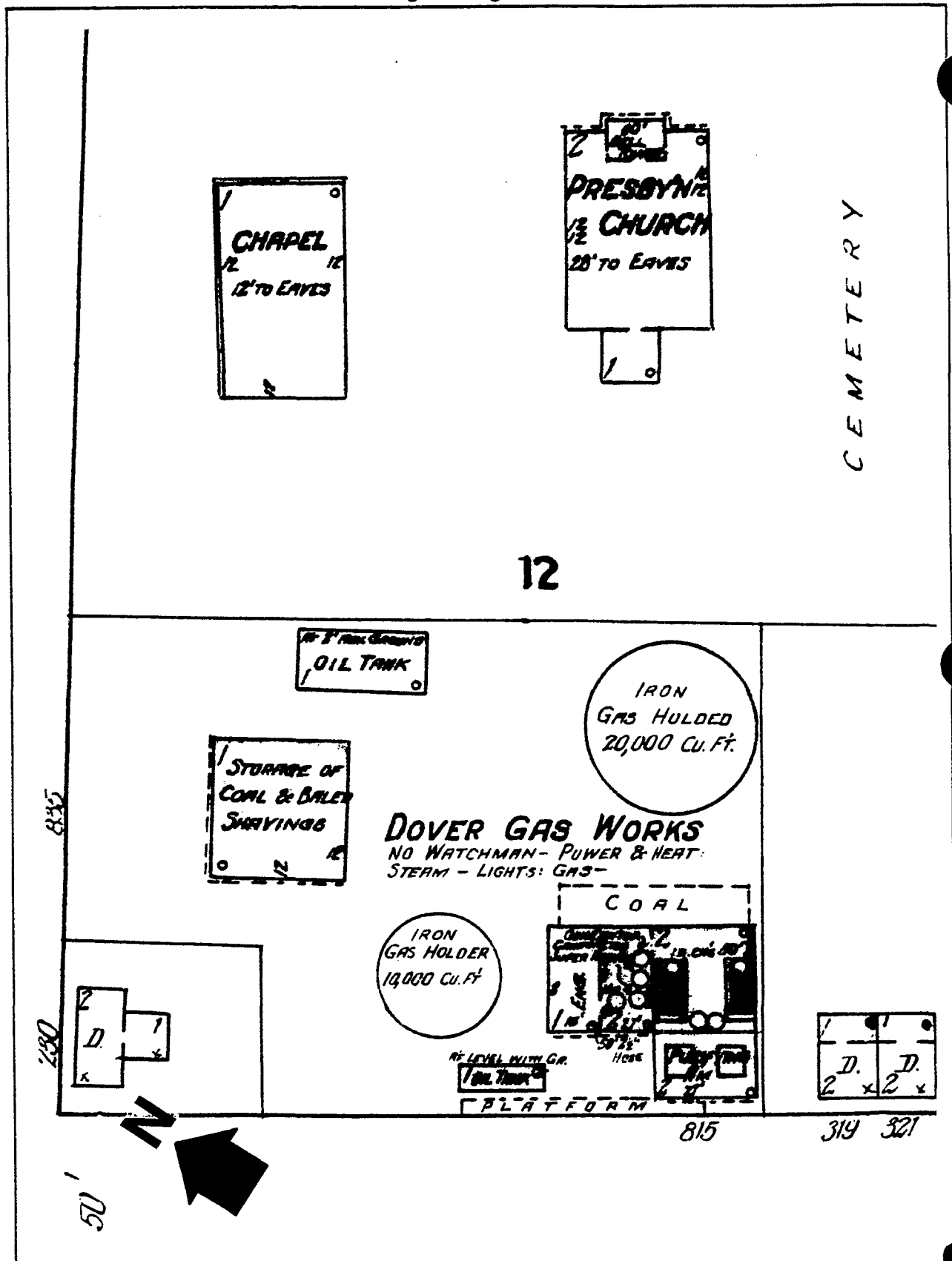
By 1910, one of the gasholders had been removed and the vacated retort building was being used for storage of coal and baled shavings. A gasholder, twice the capacity of the originals, had been added to the southeast corner of the site. One oil tank, on the eastern boundary of the site, was two feet above the ground, and replaced the former coal sheds. Another oil tank, level with the ground, was on the western boundary of the lot, adjacent to South New Street. The processing building was now rectangular in plan, with another addition on the south, used as a purifying room. There was a coal shed along its eastern elevation. The building housed additional generators. A platform was added to the western boundary of the property connecting the purifying room and one of the oil tanks. (Figure 5)

1919

By 1919, the boundaries of the gas works had doubled with the extension south to Bank Lane so that the works occupied the entire western half of the block. The original retort building was still used for storage, but the oil tanks were then listed as tar tanks. A third tar tank had been added in the southeast corner. The last original 10,000 cubic feet capacity gasholder had been demolished, and a 100,000 cubic feet capacity holder added south of the one added between 1904 and 1910. The processing plant had an addition to the south elevation. The L-shaped addition resulted in a building which was roughly T-shaped. Although in the same location, the tar tank nearest this building may have been a replacement because it was larger in size and sat two feet above ground rather than at grade. The dwelling along West North Street was now gone (Figure 6).

1929

By 1929, a one story building had been added to the site just south of the oil tank located along the eastern boundary of the property (the oil tank had been used for tar storage in 1919). The function of the new building is not identified. The tank along the western border was also used for oil storage by 1929, and near it a separate purifier, round in plan had been built as had a buried tar tank, located in the northernmost knee of the plant. The tank, located in the southeast corner, was being used for gas storage by the late 1920s. The



Source: Sanborn Fire Insurance Co. Map, 1910

Dover Gas Light

Figure 5
Dover Gas Works Site in 1910

AR300182

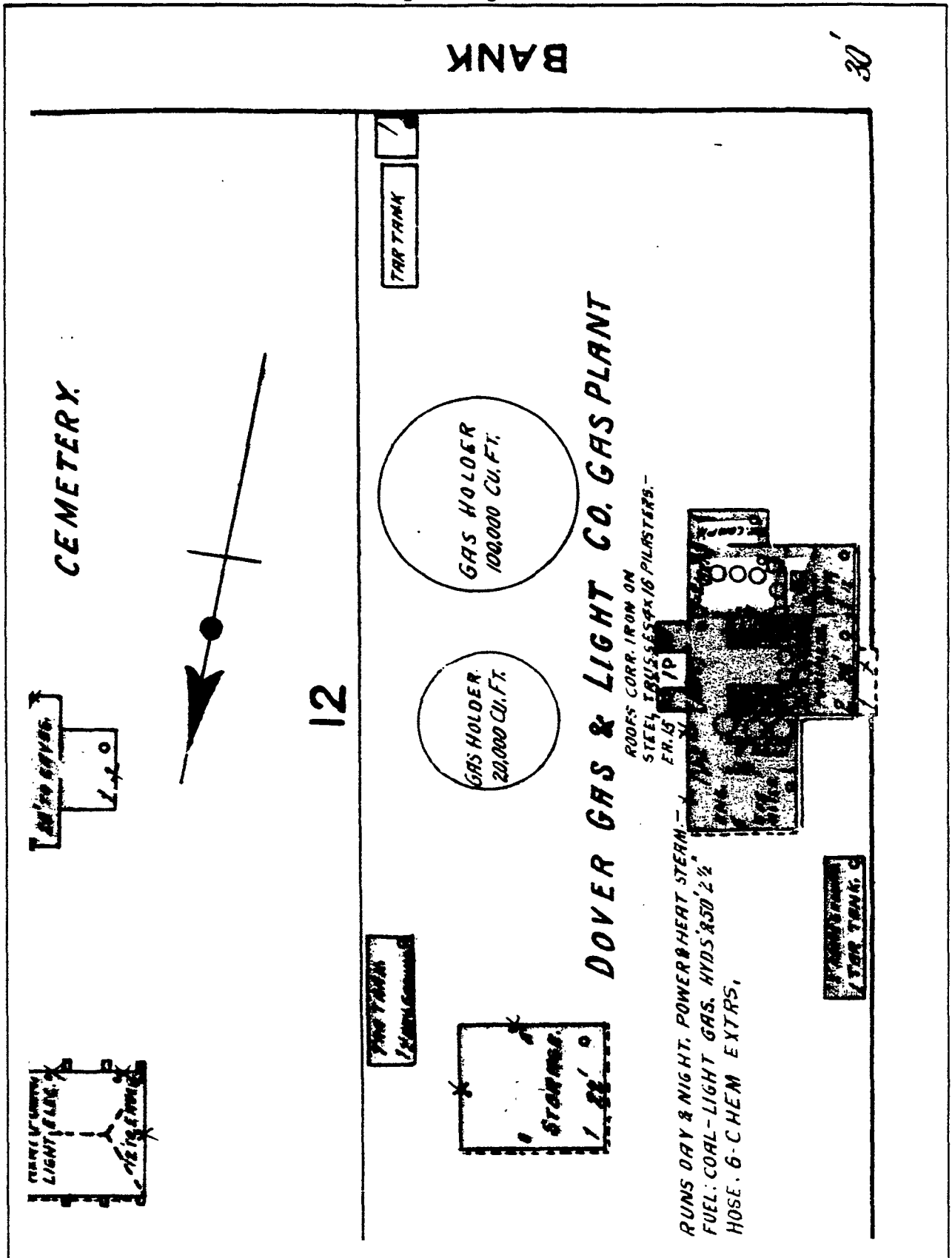


Figure 6
Dover Gas Works Site in 1919

Source: Sanborn Fire Insurance Co. Map, 1919

Dover Gas Light

AR300183



southernmost ell of the plant had either been enlarged or was an entirely new construction. (*Figure 7*)

1929 - 1950

By 1950, the entire site had been razed with the exception of the original retort building which is listed as vacant.

AR300185

IV. DESCRIPTION OF SOIL BORINGS

A total of nineteen soil borings were drilled in the project area. These soil borings were drilled to assess the nature of the geological conditions on the site. The drilling process was monitored, recorded, and evaluated by an archaeologist in order to assist in the prediction of subsurface archaeological resources. Observation of the soil borings allowed for the evaluation of the depth and nature of the fill and assisted in the prediction of the presence and integrity of potential archaeological resources. Placement of the soil borings on the property is illustrated in Figure 8.

B-1 (Figure 9)

- Stratum A: Tan grey sand (fill)
- Stratum B: Dark grey sand with brick fragments (fill)
- Stratum C: Orange brown sandy silt with brick fragments (fill)
- Stratum D: Orange micaceous sand (fill)
- Stratum E: Yellow brown micaceous sand (fill)
- Stratum F: Orange brown sand (petroleum odors)
- Stratum G: Very dark grey silty sand with dark grey staining
- Stratum H: Tan brown medium sandy clay
- Stratum I: Bright orange coarse sand and gravel

Notes: In center of original retort building demolished in mid-1980s

B-2 (Figure 9)

- Stratum A: Bright orange sand and gravel (fill)
- Stratum B: Mixed yellow grey brown sand and medium gravels (fill)
- Stratum C: Very coarse orange sand and gravel (fill)
- Stratum D: Black burnt tar clinker and ash (fill)
- Stratum E: Remains of brick foundation

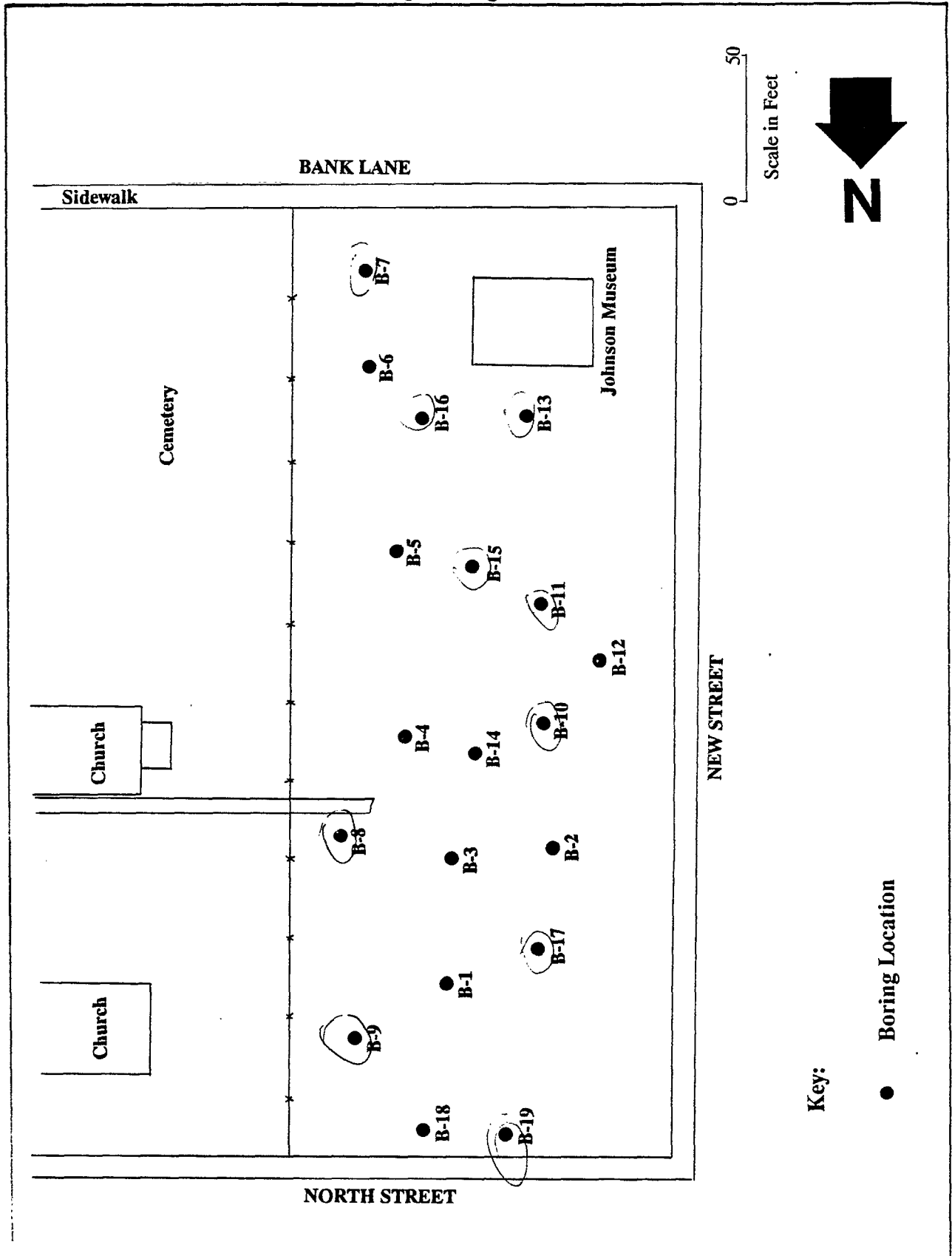
Notes: In the middle of a tank with approximately 5 feet of process-related organic material in tank.

B-3 (Figure 9)

- Stratum A: Yellow grey brown silty loam (fill)
- Stratum B: Coarse orange brown sand with gravel (fill)
- Stratum C: Loose wet brownish yellow silty sand (fill)
- Stratum D: Black gritty sand (fill)
- Stratum E: Yellow brown silty coarse sand (fill)
- Stratum F: Greyish brown sandy silt with brick fragments and gravel (fill)
- Stratum G: Brick foundation

Notes: Approximately 2 feet of process-related organic material in tank.

AR300186

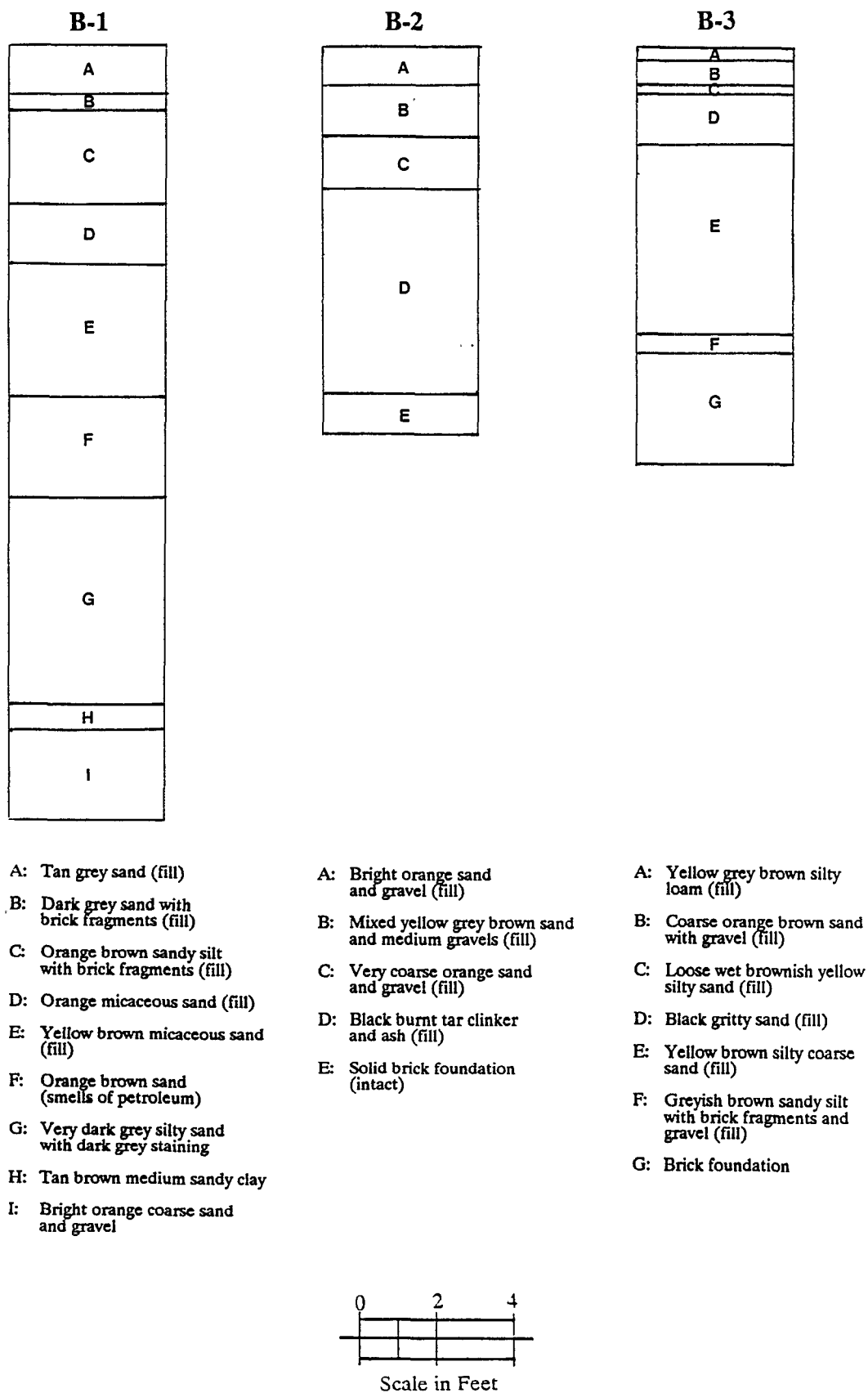


Source: Versar, Inc.

Dover Gas Light

Figure 8
Test Boring Location Map

all the see nonconcretions
AR300187



Source: Engineering-Science

Dover Gas Light

Figure 9
Stratigraphic Profiles
From Soil Borings B-1/B-3
 AR300188

B-4 (Figure 10)

Stratum A:	Dark grey brown and black mottled silty sand (fill)
Stratum B:	Coarse orange sand and gravel (fill)
Stratum C:	Greyish brown silty sand and gravel (fill)
Stratum D:	Dark grey brown to black sandy silt with brick rubble (fill)
Stratum E:	Dark brown to black silty sand with rubble (fill)
Stratum F:	Solid brick foundation

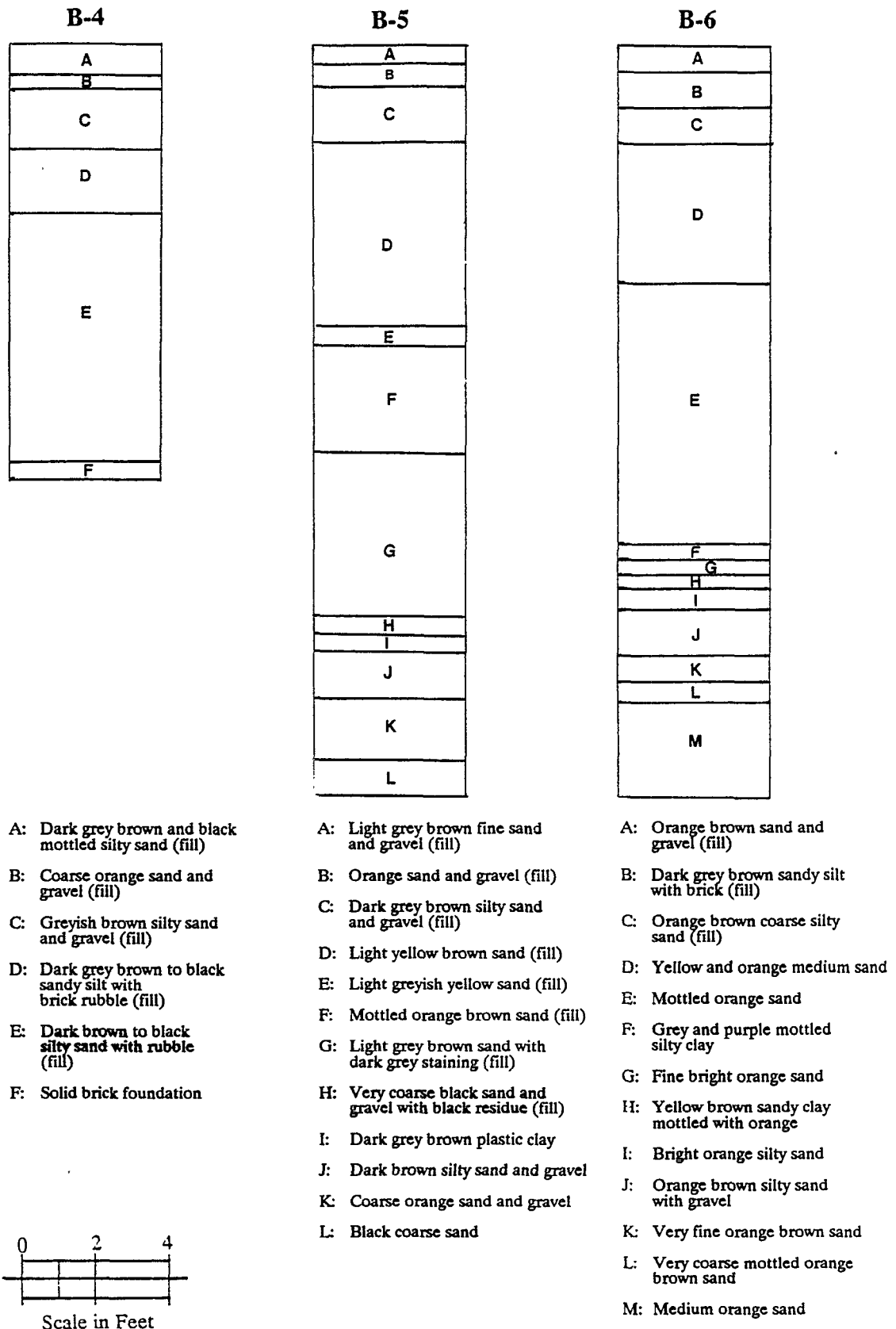
B-5 (Figure 10)

Stratum A:	Light grey brown fine sand and gravel (fill)
Stratum B:	Orange sand and gravel (fill)
Stratum C:	Dark grey brown silty sand and gravel (fill)
Stratum D:	Light yellow brown sand (fill)
Stratum E:	Light greyish yellow sand (fill)
Stratum F:	Mottled orange brown sand (fill)
Stratum G:	Light grey brown sand with dark grey staining (fill)
Stratum H:	Very coarse black sand and gravel with black residue (fill)
Stratum I:	Dark grey brown plastic clay
Stratum J:	Dark brown silty sand and gravel
Stratum K:	Coarse orange sand and gravel
Stratum L:	Black coarse sand

B-6 (Figure 10)

Stratum A:	Orange brown sand and gravel (fill)
Stratum B:	Dark grey brown sandy silt with brick (fill)
Stratum C:	Orange brown coarse silty sand (fill)
Stratum D:	Yellow and orange medium sand
Stratum E:	Mottled orange sand
Stratum F:	Grey and purple mottled silty clay
Stratum G:	Fine bright orange sand
Stratum H:	Yellow brown sandy clay mottled with orange
Stratum I:	Bright orange silty sand
Stratum J:	Orange brown silty sand with gravel
Stratum K:	Very fine orange brown sand
Stratum L:	Very coarse mottled orange brown sand
Stratum M:	Medium orange sand

Notes: Relatively clean boring; water table encountered at c. 12 feet



Source: Engineering-Science

Dover Gas Light

Figure 10
Stratigraphic Profiles
From Soil Borings B-4/B-6

AR300190

B-7 (Figure 11)

Stratum A:	Asphalt and gravel with coke (fill)
Stratum B:	Orange sand and gravel with coke (fill)
Stratum C:	Medium brown silty sand with coke (fill)
Stratum D:	Orange sand (fill)
Stratum E:	Tan sand with gravel and coke (fill)
Stratum F:	Light orange to yellow sand with iron concretions
Stratum G:	Yellowish white coarse sand with gravel
Stratum H:	Dark greyish brown clay-sand with gravel
Stratum I:	Bright orange very coarse sand and gravel
Stratum J:	Coarse orange sand mottled with brown sand

Notes: Water table encountered at c. 11 feet; asphalt between Strata B & C and C & D; terra cotta pipe fragments at the interface of Strata C and D; Stratum B contains one fragment of undecorated whiteware

B-8 (Figure 11)

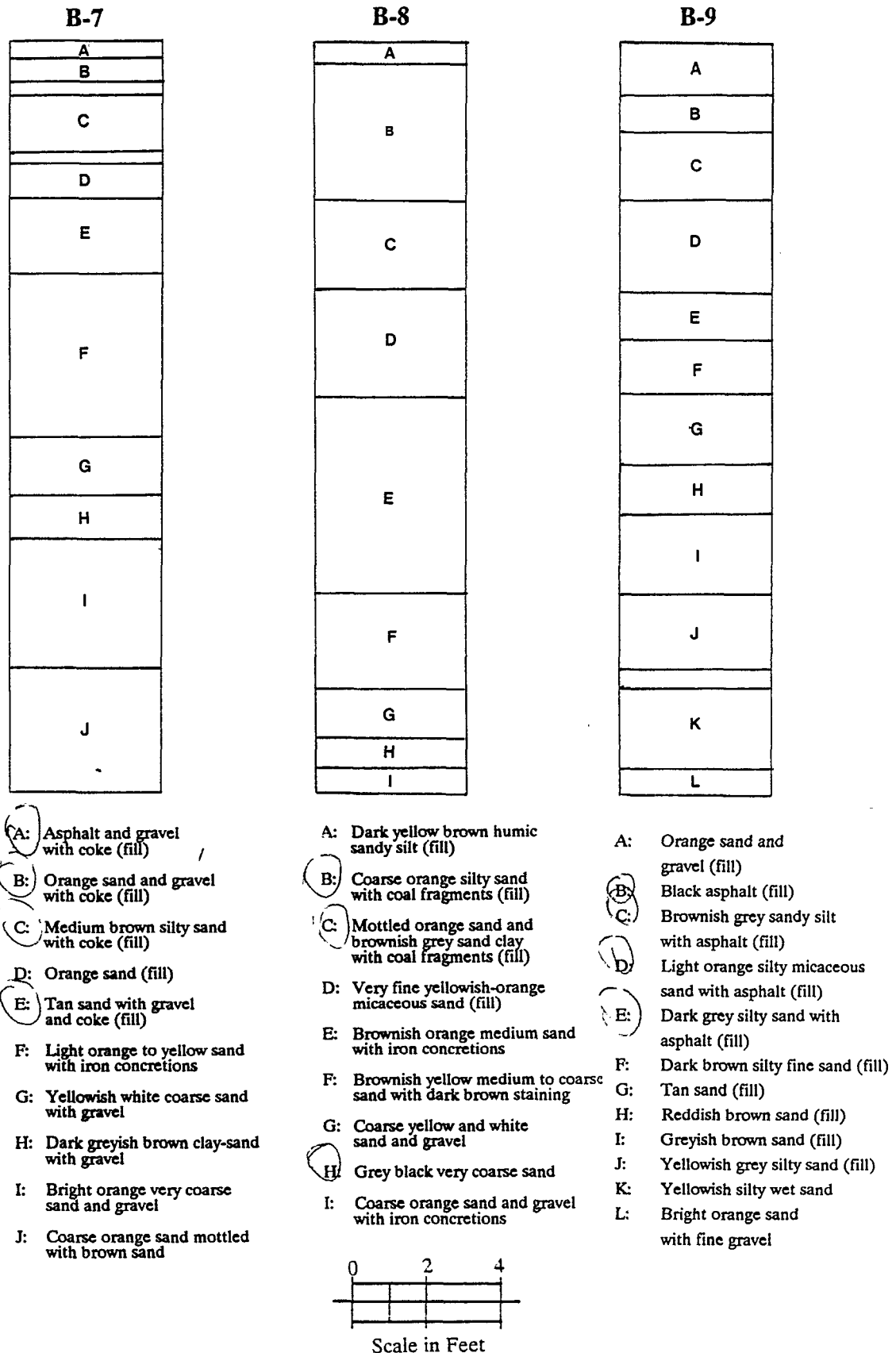
Stratum A:	Dark yellow brown humic sandy silt (fill)
Stratum B:	Coarse orange silty sand with coal fragments (fill)
Stratum C:	Mottled orange sand and brownish grey sand clay with coal fragments (fill)
Stratum D:	Very fine yellowish-orange micaceous sand (fill)
Stratum E:	Brownish orange medium sand with iron concretions
Stratum F:	Brownish yellow medium to coarse sand with dark brown staining
Stratum G:	Coarse yellow and white sand and gravel
Stratum H:	Grey black very coarse sand
Stratum I:	Coarse orange sand and gravel with iron concretions

B-9 (Figure 11)

Stratum A:	Orange sand and gravel (fill)
Stratum B:	Black asphalt (fill)
Stratum C:	Brownish grey sandy silt with asphalt (fill)
Stratum D:	Light orange silty micaceous sand with asphalt (fill)
Stratum E:	Dark grey silty sand with asphalt (fill)
Stratum F:	Dark brown silty fine sand (fill)
Stratum G:	Tan sand (fill)
Stratum H:	Reddish brown sand (fill)
Stratum I:	Greyish brown sand (fill)
Stratum J:	Yellowish grey silty sand (fill)
Stratum K:	Yellowish silty wet sand
Stratum L:	Bright orange sand with fine gravel

Notes: Water table encountered at c. 14 feet

AR300191



Source: Engineering-Science

Dover Gas Light

Figure 11
Stratigraphic Profiles
From Soil Borings B-7/B-9
AR300192

B-10 (Figure 12)

Stratum A:	Dark grey brown sand and gravel (fill)
Stratum B:	Coarse orange brown sand and gravel (fill)
Stratum C:	Very dark grey brown silty sand and gravel with cement and brick rubble (fill)
Stratum D:	Yellow and orange very hard-packed sandy silt with cement and brick rubble (fill)
Stratum E:	Light yellow grey silty sand with cement and brick rubble (fill)
Stratum F:	Yellow brown medium sand with grey staining
Stratum G:	Yellowish grey and medium grey sandy silt
Stratum H:	Dark brown coarse sand and gravel (oily)
Stratum I:	Mottled grey brown and orange brown clay
Stratum J:	Mottled orange silty clay with brown silty clay
Stratum K:	Yellow brown silty sand
Stratum L:	Bright orange sand and gravel

Notes: *Water table encountered at c. 11 feet*

B-11 (Figure 12)

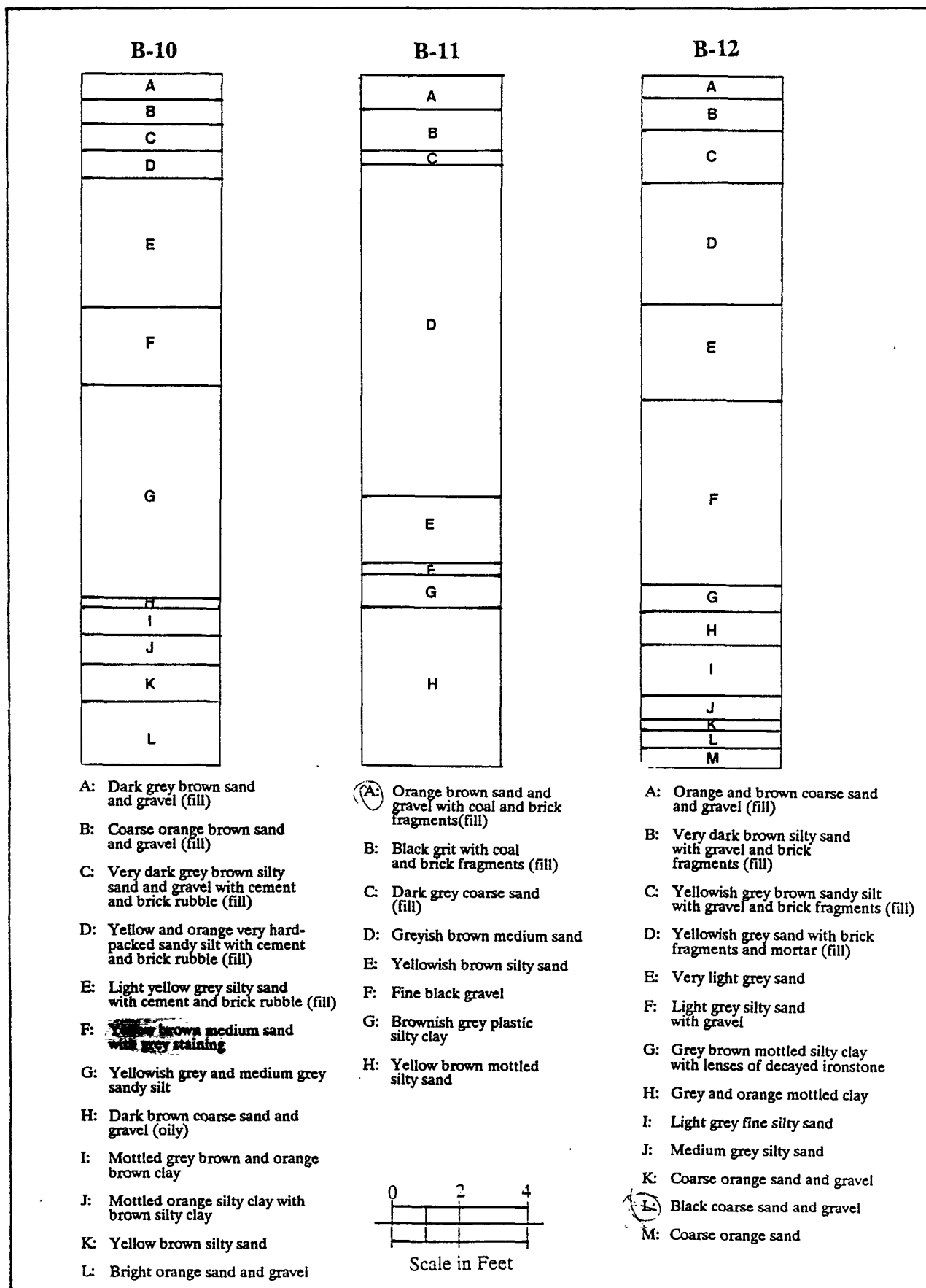
Stratum A:	Orange brown sand and gravel with coal and brick fragments(fill)
Stratum B:	Black grit with coal and brick fragments (fill)
Stratum C:	Dark grey coarse sand (fill)
Stratum D:	Greyish brown medium sand
Stratum E:	Yellowish brown silty sand
Stratum F:	Fine black gravel
Stratum G:	Brownish grey plastic silty clay
Stratum H:	Yellow brown mottled silty sand

Notes: *Water table encountered at c. 12 feet*

B-12 (Figure 12)

Stratum A:	Orange and brown coarse sand and gravel (fill)
Stratum B:	Very dark brown silty sand with gravel and brick fragments (fill)
Stratum C:	Yellowish grey brown sandy silt with gravel and brick fragments (fill)
Stratum D:	Yellowish grey sand with brick fragments and mortar (fill)
Stratum E:	Very light grey sand
Stratum F:	Light grey silty sand with gravel
Stratum G:	Grey brown mottled silty clay with lenses of decayed ironstone
Stratum H:	Grey and orange mottled clay
Stratum I:	Light grey fine silty sand
Stratum J:	Medium grey silty sand
Stratum K:	Coarse orange sand and gravel
Stratum L:	Black coarse sand and gravel
Stratum M:	Coarse orange sand

Notes: *Water table encountered at c. 12 feet*



Source: Engineering-Science

Dover Gas Light

Figure 12
Stratigraphic Profiles
From Soil Borings B-10/B-12
AR300194

B-13 (Figure 13)

- Stratum A: Yellow brown (dark humic) sandy silt with brick fragments (fill)
Stratum B: Brownish orange sand with gravel, brick and cinder (fill)
Stratum C: Very dark brown and black ash mottled with black and orange silty sand (fill)
Stratum D: Bright orange fine micaceous sand and gravel (fill)
Stratum E: Coarse yellow orange sand
Stratum F: Yellow brown coarse sand
Stratum G: Compact grey brown compact sand
Stratum H: Orange brown slightly silty clay
Stratum I: Very coarse orange sand and fine gravel

Notes: Water table encountered at c. 12 feet

B-14 (Figure 13)

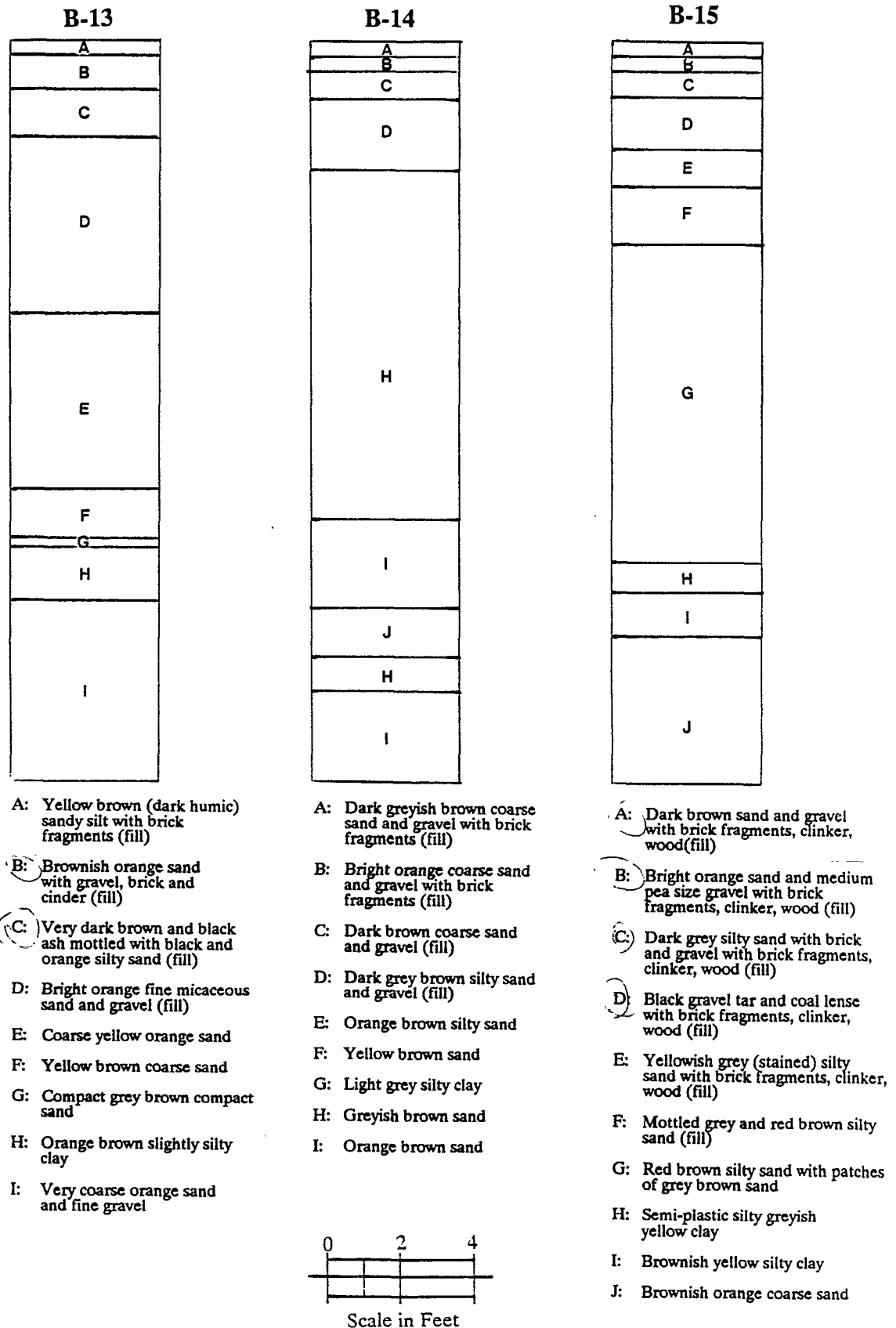
- Stratum A: Dark greyish brown coarse sand and gravel with brick fragments (fill)
Stratum B: Bright orange coarse sand and gravel with brick fragments (fill)
Stratum C: Dark brown coarse sand and gravel (fill)
Stratum D: Dark grey brown silty sand and gravel (fill)
Stratum E: Orange brown silty sand
Stratum F: Yellow brown sand
Stratum G: Light grey silty clay
Stratum H: Greyish brown sand
Stratum I: Orange brown sand

Notes: Water table encountered at c. 14 feet

B-15 (Figure 13)

- Stratum A: Dark brown sand and gravel with brick fragments, clinker, wood(fill)
Stratum B: Bright orange sand and medium pea size gravel with brick fragments, clinker, wood (fill)
Stratum C: Dark grey silty sand with brick and gravel with brick fragments, clinker, wood (fill)
Stratum D: Black gravel tar and coal lense with brick fragments, clinker, wood (fill)
Stratum E: Yellowish grey (stained) silty sand with brick fragments, clinker, wood(fill)
Stratum F: Mottled grey and red brown silty sand (fill)
Stratum G: Red brown silty sand with patches of grey brown sand
Stratum H: Semi plastic silty greyish yellow clay
Stratum I: Brownish yellow silty clay
Stratum J: Brownish orange coarse sand

Notes: Water table encountered at c. 12 feet; rope found at interface of Strata F and G



Source: Engineering-Science

Dover Gas Light

Figure 13
Stratigraphic Profiles
From Soil

AR300196

B-16 (Figure 14)

Stratum A:	Bright orange coarse sand with gravel (fill)
Stratum B:	Black gritty sand with asphalt (fill)
Stratum C:	Bright orange sand with coal slag (fill)
Stratum D:	Dark greyish brown sandy silt (fill)
Stratum E:	Orange brown medium sand and gravel
Stratum F:	Yellow orange fine sand with grit and gravel
Stratum G:	Coarse yellow brown sand and gravel
Stratum H:	Black gravel and coarse oily sand
Stratum I:	Dark brownish grey clay
Stratum J:	Coarse yellow brown sand and gravel
Stratum K:	Medium sand and gravel with brown staining
Stratum L:	Black decayed stone and sand
Stratum M:	Bright orange coarse sand with iron concretions

Notes: *Water table encountered at c. 11 feet*

B-17 (Figure 14)

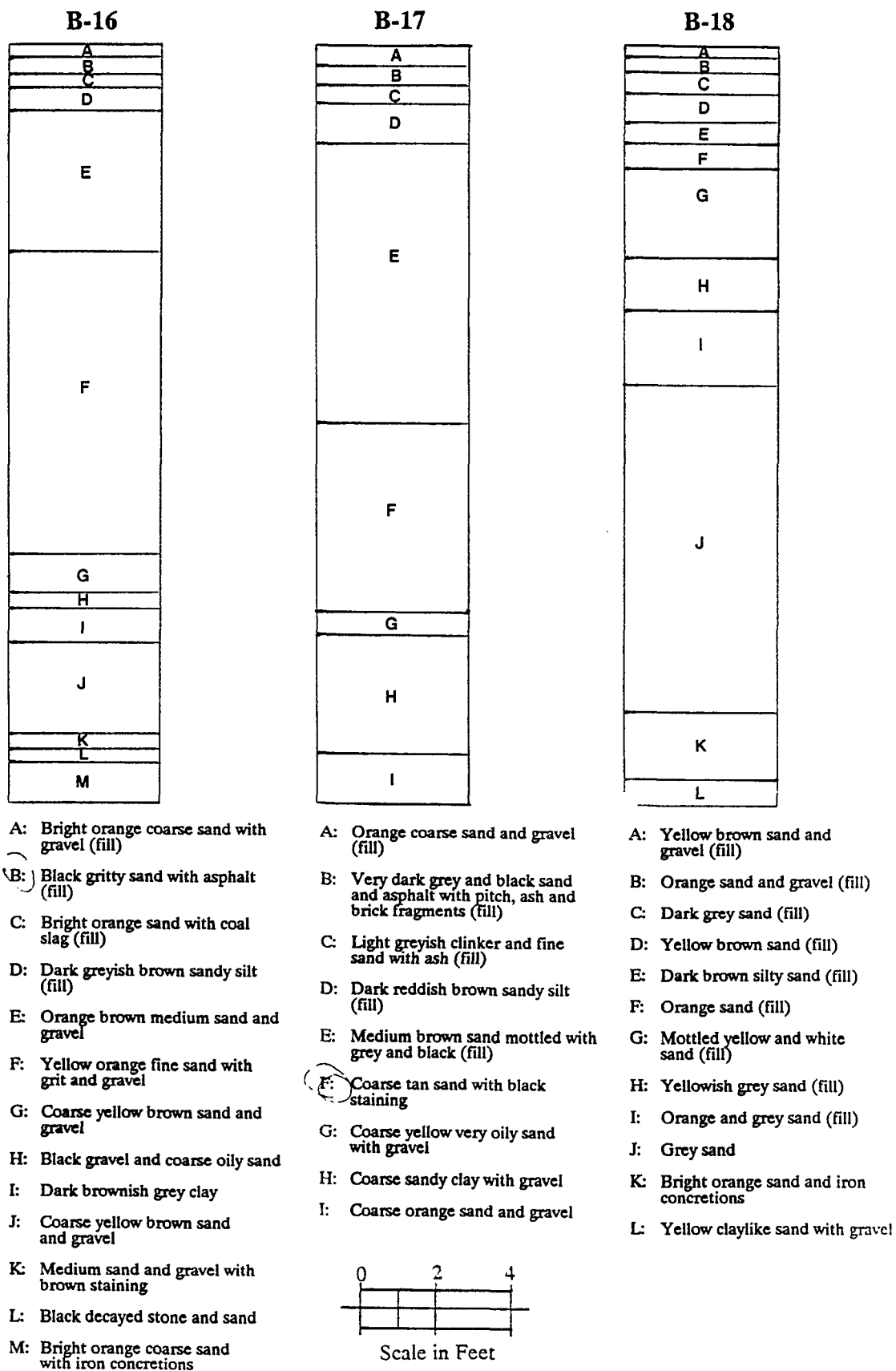
Stratum A:	Orange coarse sand and gravel (fill)
Stratum B:	Very dark grey and black sand and asphalt with pitch, ash and brick fragments (fill)
Stratum C:	Light greyish clinker and fine sand with ash (fill)
Stratum D:	Dark reddish brown sandy silt (fill)
Stratum E:	Medium brown sand mottled with grey and black (fill)
Stratum F:	Coarse tan sand with black staining
Stratum G:	Coarse yellow very oily sand with gravel
Stratum H:	Coarse sandy clay with gravel
Stratum I:	Coarse orange sand and gravel

Notes: *Water table encountered at c. 12 feet*

B-18 (Figure 14)

Stratum A:	Yellow brown sand and gravel (fill)
Stratum B:	Orange sand and gravel (fill)
Stratum C:	Dark grey sand (fill)
Stratum D:	Yellow brown sand (fill)
Stratum E:	Dark brown silty sand (fill)
Stratum F:	Orange sand (fill)
Stratum G:	Mottled yellow and white sand (fill)
Stratum H:	Yellowish grey sand (fill)
Stratum I:	Orange and grey sand (fill)
Stratum J:	Grey sand
Stratum K:	Bright orange sand and iron concretions
Stratum L:	Yellow claylike sand with gravel

AR300197



Source: Engineering-Science

Dover Gas Light

Figure 14
 Stratigraphic Profiles
 From Soil Borings B-16/B-18

AR300198

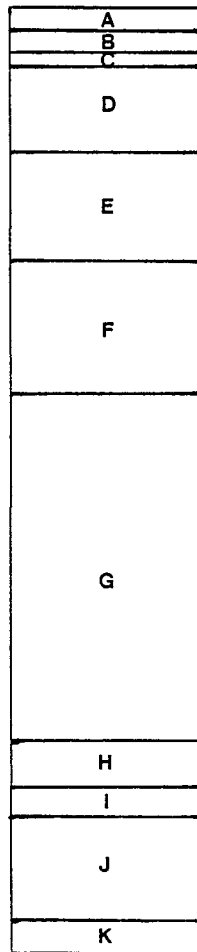
B-19 (Figure 15)

- Stratum A: Dark brown gritty sand with gravel (fill)
- Stratum B: Orange sand and gravel (fill)
- Stratum C: Dark grey silt with gravel with brick fragments (fill)
- Stratum D: Greyish brown silt with brick fragments (fill)
- Stratum E: Light orange brown micaceous silty sand with coal (fill)
- Stratum F: Mottled yellow brown sand
- Stratum G: Grey sand
- Stratum H: Tan-orange sand with iron concretions
- Stratum I: Orange sandy clay and gravel
- Stratum J: Light yellow coarse sand and fine gravel
- Stratum K: Bright orange coarse sand and gravel with iron concretions

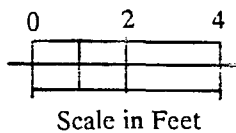
Notes: *Water table encountered at c. 12 feet*

AR300199

B-19



- A: Dark brown gritty sand with gravel (fill)
- B: Orange sand and gravel (fill)
- C: Dark grey silt with gravel with brick fragments (fill)
- D: Greyish brown silt with brick fragments (fill)
- E: Light orange brown micaceous silty sand with coal (fill)
- F: Mottled yellow brown sand
- G: Grey sand
- H: Tan-orange sand with iron concretions
- I: Orange sandy clay and gravel
- J: Light yellow coarse sand and fine gravel
- K: Bright orange coarse sand and gravel with iron concretions



Source: Engineering-Science

Dover Gas Light

Figure 15
Stratigraphic Profiles
From Soil Boring B-19
AR300200

VI. EVALUATION OF FINDINGS

A. Historical Documentation

The approximate location of structures and features associated with the Dover Gas Light Company has been determined by the historical documentation, especially deed and map research. The location of both above-ground structures and subsurface storage features are indicated on the Pomeroy and Beers and Sanborn Fire Insurance Company maps. These (*See Figures 2-7*) illustrate potentially significant archaeological features, some of which may still be on site.

As far as is currently known, the site was not built upon prior to at least 1868. The site of the gas plant was purchased from John C. Pennewill in 1859. Structures associated with Pennewill are illustrated on the Pomeroy & Beers Atlas Map of 1868, located somewhat to the west of the project area. The structure noted as a dwelling in Sanborn maps on the northwest portion of the site is not shown on the aforementioned 1859 map. The dwelling structure (ca. 1885-1919) appears on all insurance maps, but was not directly associated with the manufacturing process on site.

The original retort building and one gasholder are shown on the site in 1868. Auxiliary buildings and features, such as coal sheds, if they existed, are not illustrated on this atlas map. The later insurance maps are more illustrative of these other plant-related structures and features, since they were of immediate concern to the insurance companies. By 1897, the original retort building was abandoned, and a new processing structure erected to house the generator, blower and meter, with a separate purifying room. There were also three gasholders on site by this time. These changes also coincide with the increased demand for gas and the expansion of services for both commercial and residential needs.

Between 1897 and 1919, the facility expanded in capacity, and the property was further developed. The processing building was enlarged, and the smaller gasholders replaced with ones with larger capacity, including a 20,000 and a 100,000 cubic feet gasholder. Oil tanks replaced the coal storage bins, and the site was more intensively utilized. The dwelling on the northwest corner of the property was removed sometime during this period.

By 1950, all of the buildings on site had been demolished with the exception of the original retort house. The retort house was used by the Delaware State Museum to store heavy exhibits until the mid-1980s, burned in 1982, and dismantled several years later. This structure had no basement.

It has been suggested, but not confirmed, that at the time of demolition, some destruction debris (cement and brick rubble) from the demolished processing and generating building was used to infill the basement of that structure (Jim Stewart, Delaware Bureau of Museums and Historic Sites Administrator; 1991: personal communication).

AR300201

B. Remote Sensing

Findings from the geophysical study, especially the ground penetrating radar survey, indicated the presence of anomalies which correspond with the locations of known structural features. In the northwest corner, an anomaly corresponds with the location of a dwelling. Other anomalies appear in the location of the main structure and where several of the gas holders were located. The identification of a demolished brick building (original retort structure) is based on presence of brick rubble on the ground surface. For more complete information on this study, see Appendix B - Geophysical Survey.

C. Soil Borings

The primary purpose of the soil boring survey was to further elucidate predictions concerning contaminants on the site. An archaeologist, present on site during the soil borings, examined the findings relative to predictions of cultural features remaining below ground. An examination of the soil borings reveals the presence of from 2 to 15 feet of fill across the site. The borings also confirm the general prediction that the intense industrial use of the property during the nineteenth and twentieth century has affected the original soil stratigraphy. The original nineteenth century ground surface may have been between two and five feet below existing elevation (Borings B-16, B-6, B-19). Some of the structures on the site had deep foundations, or required excavation prior to installation of the necessary industrial features.

Soil boring B-1 was drilled in the interior of the original retort house. It was anticipated from the historical documentation that soil boring B-1 could intercept a coke furnace. However, no evidence of this furnace was discovered. Only soil and brick rubble was encountered to a depth of nine feet, even though the structure reportedly did not have a basement. Because this building was abandoned early in twentieth century, the furnace, retort ovens, and other equipment were undoubtedly removed.

Soil boring B-2 intercepted the brick base of a gasholder at a depth of ten feet. This gas holder is appears on the Sanborn map of 1885. Soil boring B-3 intercepted the base of a gasholder at 12 feet below surface. This gas holder is also illustrated on the 1885 Sanborn map. Soil boring B-4 intercepted the brick base of a gasholder at a depth of twelve feet. This gas holder is illustrated on the 1897 Sanborn map.

It was anticipated that soil boring B-5 would intercept the largest gasholder. This soil boring was drilled to a depth of twenty feet with no indication of the presence of a gasholder. At 1-1/2 feet, a 4 inch concrete slab was found. The absence of a brick or stone foundation for a gasholder indicates that the structure was removed, and the hole was filled.

AR300202

Soil boring B-7 was drilled in the location of a tar tank, in the southeast corner of the site. There was no evidence of a tank. Below asphalt layers at 1-1/2 feet and 3 feet, there was evidence of rubble and piping.

Soil borings B-10, B-11 and B-12 were drilled in the interior of the newer processing and generating building. B-10 and B-12 were in the oldest section of the structure, while B-11 was located in a newer addition, dating from the 1910 to 1919 period. Oral tradition indicates that this structure was demolished and that demolition rubble may have been used to infill the basement. The presence of brick rubble in these three borings appears to support this conclusion. It is possible some subsurface remains of the basement structure may still be relatively intact, including foundation walls. The structure was built in several phases, however, and not all additions may have had cellars or basements. Equipment was probably removed prior to demolition. Therefore the basement remains are not expected to reveal significant information related to gas works operation.

Soil borings B-9, B-18 and B-19 were all drilled in the northeast corner of the site. This area contained deep fill and evidence of asphalt. In B-19, there was fill to 5-1/2 feet, and coal fragments and rubble were found.

No borings were placed within the area of the old dwelling house (ca. 1885 - 1919) on the northwest corner of the block because it was not an integral part of the gas works operation, and thus conclusions regarding presence and integrity of structural remains in this location are not addressed in this report.

AR300203

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The project area was the site of the Dover gas works for ninety years, from 1859 to 1949. The facility produced gas for residential, commercial and industrial use during that period for public and private illumination and energy purposes. Gas for illumination was common in the very large cities such as New York, Boston, Baltimore and New Orleans by at least 1840. It did not make its appearance in smaller communities until the 1850s or later, and then was limited to towns with sufficient resources to support such an industry.

The Dover gas works industry made this community the center of an expanding regional commercial and industrial economy. Dover was the distribution point for an agricultural economy, and became a food processing center for the region. The advent of manufactured gas in Dover, in combination with the railroad, the canning industry and rich farmlands, made possible the transformation of the region and the development of the downstate region. Heretofore, industry generally was confined to the Wilmington area. The industry is, therefore, a significant element in the historical development of the state.

Documentary background research, in combination with geophysical studies and soil borings revealed the location of subsurface features associated with the Dover Gas Light Company. Findings from the geophysical survey indicated the presence of anomalies in the location of three of the gas holders, the main structure and the dwelling. Locations of several other subsurface features known to be historically present were not detected in the geophysical survey. The soil borings verified the presence of three gas holders identified in the historical research and detected through the geophysical survey. The locations of two other gasholders were indicated by the documentary research although no anomalies were present in those areas during the geophysical survey. Soil boring data suggested that the gas holders at these locations may have been removed and filled. The geophysical survey detected an anomaly in the location of the main processing building. Soil borings within this structure showed the presence of rubble which would be associated with the demolition of that structure.

Based upon the findings of the documentary research, remote sensing, and soil borings, it is anticipated that some archaeological resources associated with the coal gasification plant and related activities will be present on the site. These resources lie beneath at least two feet of fill deposits. Deep subsurface architectural features such as basements and structural foundations were filled with demolition debris, and also present on the site. Research has indicated that a small gas works, such as this one, were often adapted to local conditions, and did not follow standard operating procedures nor construction techniques. Architecture followed a vernacular form, rather than standard design for larger operations. This is probably the case here, which makes an understanding of site operation of some importance, especially given the significance of the industry to Delaware's history.

AR300204

There is considerable historical documentation available concerning the site, its use and associated development that has not been pursued during this assessment study. In addition, some persons who were associated with the Dover Gas Light Company in the earlier part of the century are still living in the area, and have information concerning the industrial process, the operation of the plant, and its place within the community and region. This oral history is very important to the full documentation of a significant element of the region and state's history.

B. Recommendations

It is recommended that a Phase IB archaeological study be done to ascertain the presence of potentially significant archaeological resources on the site and the degree of disturbance to those resources. The study should include a review and analysis of the historical documentation of the Dover Gas Light Company and from state archives, photographs and maps. In addition, oral accounts of former employees and local residents concerning operation of the facility that was obtained from depositions should be part of this study.

Considerable research has already been conducted of gas holders in larger communities (eg., Troy Gas Light Company, Gasholder House, HAER No. NY-2), and the gasification process has been the focus of numerous studies. This site is significant for its association with the town and region, and thus analysis of the site should focus on those features which contribute to this association. The gas works in its "heyday" (1880 - 1930) appears to be well documented, although there is less readily available information on the early history of the gas works.

Because of the presence and depth of fill material and the nature of the ground cover in the project area, a backhoe will have to be employed to remove fill material. Wherever possible, these trenches should be placed to avoid release of contaminants. A total of five shallow backhoe trenches are proposed to be excavated in the project area to determine the presence and nature of potentially significant archaeological resources. }

The first trench proposed to be excavated is in the location of the original section of the main processing structure to verify its location and integrity. Soil borings B-10 and B-12 were drilled in this location.

The second and third trenches are to be excavated to intercept the gas holder walls. Soil borings B-2 and B-4 were drilled in these locations. Soil boring B-2 intercepted a gas holder which appears on the 1885 map, while the gas holder encountered in soil boring B-4 was not present on a map until 1897. Location and identification of the walls should be sufficient, without deep excavation into the fill deposits of the gas holders.

The fourth trench is to be excavated in the location of the former dwelling recorded on the insurance maps. The trench should be located to intercept where they may have been foundation walls and yard areas. No soil borings were drilled in

AR300205

their location. The purpose of this excavation will be to locate and identify the presence of potentially significant archaeological resources.

A fifth trench is proposed in the former location of the original retort building. The trench is proposed to determine if archaeologically significant features exist. The retort building, which was the first structure on the site, remained in place until 1982, when it burned down and was removed. Soil boring B-1 drilled in this location suggested that there is deep fill, although the retort building had no cellar or basement.

At this time, it is suggested that the trenches only be excavated to a minimal depth necessary to locate and identify anticipated subsurface features. This should be between three and five feet below existing ground surface. Their width will be determined by trench depth, to maintain safe site conditions. This should be sufficient to meet the goals of this level of study. It will also avoid excessive disturbance to possible site contaminants. The use of historical photographs and information from the remote sensing and soil borings should allow fairly precise placement of trenches, thus avoiding the need for long exploratory trenches.

After the backhoe removes any modern fill and demolition material overlying intact surfaces or features, hand excavation will be employed. All features will be drawn and photographed. Profile drawings and photographs will be made for all trenches. The location of all trenches and features will be recorded on a site map.

Because of the nature of the by-products of the coal gasification process, appropriate precautions will be employed when conducting Phase IB subsurface testing. Artifact and field data will be analyzed. A report will be prepared which will describe and analyze findings and make recommendations for future study, if necessary. A detailed IB work plan will be developed, which will include details on QA/QC, field work, laboratory processing, analysis, report preparation and production, and a health and safety plan.

AR300206

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AR300207

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AR300208

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AR300209

APPENDIX A

LIST OF PERSONNEL

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